

# Building Momentum to Realign Incentives to Support Open Science

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## ABSTRACT

The COVID-19 pandemic highlights the urgent need to strengthen global scientific collaboration, and to ensure the fundamental right to universal access to scientific progress and its applications. Open Science (OS) is central to achieving these goals. It aims to make science accessible, transparent, and effective by providing barrier-free access to scientific publications, data, and infrastructures, along with open software, Open Educational Resources, and open technologies. OS also promotes public trust in science at a time when it has never been more important to do so. Over the past decade, momentum towards the widespread adoption of OS practices has been primarily driven by declarations (e.g., DORA, the Leiden Manifesto). These serve an important role, but for OS to truly take root, researchers also must be fully incentivized and rewarded for its practice. This requires research funders and academic leaders to take the lead in collaborating, with researchers in designing, and implementing new incentive structures, and to actively work to socialize these throughout the research ecosystem. The US National Academies of Science, Engineering, and Medicine (NASEM) Roundtable on Aligning Research Incentives for OS is one such effort. This paper examines the strategy behind convening the Roundtable, its current participant makeup, focus, and outputs. It also explores how this approach might be expanded and adapted throughout the global OS community.

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## 1. THE NEED TO REALIGN RESEARCH INCENTIVES

*“Openness and sharing of information are fundamental to the progress of science and to the effective functioning of the research enterprise...” [1]—The US National Academies of Science, Open Science By Design: Realizing a Vision for 21<sup>st</sup> Century Research Report*

Over the past decade, there has been growing recognition that increasing the openness of the scientific process can accelerate its benefits, by strengthening rigor and reliability, broadening participation in research, and widening the diffusion of its results. Support for Open Science (OS) has been particularly visible as research funders (both private philanthropies and public agencies) have adopted policies requiring open sharing of research outputs generated by their funded research. These funder policies are largely driven by the belief that openness is a critical enabling strategy to advance progress towards their core missions. As one set of funders wrote, “We believe that openness benefits society by accelerating the pace of discovery, reducing information-sharing gaps, encouraging innovation, and promoting reproducibility<sup>①</sup>”.

At the same time, there has also been a growing recognition by Higher Education Institutions (HEIs) that increased openness, especially in the research communication process, is important to their effective operations. The mission statements of HEIs often speak directly to the goal of the advancement of discovery, the broad diffusion of knowledge, and direct public engagement with the intellectual outputs of the institution—all of which benefit from greater openness.

The COVID pandemic is fueling this trend. In July of 2020, Janet Napolitano, President of the University of California System, publicly called upon her counterparts in the university leadership community to commit to opening up its research, noting:

*“The COVID-19 crisis inspired a global collaboration that has led to a scientific renaissance—and we must not revert to our old ways. Now is the time for all universities to join us in taking a stand for the public good and making a real commitment to open up our research” [2].*

OS, with its emphasis on transparency, inclusiveness, and openness is a perfect tool to do this. And yet, its practices are not yet widely mainstream. Researchers have not yet universally embraced OS, citing multiple points of concern including worries over being scooped if they share their data too early, possible conflicts with copyrights if they make articles openly available, etc. But perhaps the most universally shared concern is that they simply will not be rewarded for engaging in OS practices in the processes that matter the most—funding evaluation, promotion and tenure reviews—to the same degree that they are rewarded for engaging in conventional closed practices.

<sup>①</sup> <http://www.orfg.org>

## 2. HOW DO WE ADDRESS THIS ISSUE?

For meaningful change to occur, it is critical for research funders and universities—the stakeholders who can most directly and immediately influence the incentives system—to work together. The mission alignment between these two key groups provides key common ground, and the trend of increasing funder policies requiring open sharing of research outputs provides a critical area of mutual interest—and a common problem to solve.

When funders enact open research policies, they routinely encounter a common challenge with researchers: funder open access policies are often in direct conflict with their institutions' promotion and tenure requirements. For example, a funder may require making articles open access (OA), but the researchers' institutions tenure policy only rewards publishing in non-OA journals with specific impact factors. This puts researchers in a position that is very difficult for them to navigate.

This situation has also presented an opportunity. As funders became aware of this issue, they began to reach out directly to university leaders to work together to solve this problem. The essential conversation centered around an issue critical to both funders and research institutions: "We want to ensure the continued flow of research funding to your institutions. What can we do to work together to take this friction out of the system?" This is a potentially fruitful avenue for collaboratively realigning incentives to support OS practices.

To achieve the kind of impact necessary to catalyze systemic change, it is critical for these conversations to be coordinated at a highly visible, national level. A key group of research funders recognized the potential of this strategy. The Open Research Funders Group (ORFG) stepped up to the challenge. ORFG is a partnership of 14 philanthropic organizations committed to the open sharing of research outputs. The members (including HHMI, Schmidt Futures, the Sloan Foundation, and others) collectively invest more than \$10 billion annually in research funding, and were uniquely positioned to act collectively to jumpstart this process. Under the coordination of SPARC (the Scholarly Publishing and Academic Resources Coalition), the ORFG approached the US National Academies of Science, Engineering, and Medicine (NASEM) about serving as the convenor for a coordinated set of conversations to address this issue. The NASEM Board on Research Data and Information agreed, and a new national level initiative on aligning incentives to support OS was established.

## 3. NASEM ROUNDTABLE ON ALIGNING RESEARCH INCENTIVES FOR OS

In February of 2019, in collaboration with the Open Research Funders Group, the National Academies launched the Roundtable on aligning research incentives for OS. This multi-year project convenes critical stakeholders to fundamentally improve the correlation between open practices, credit/reward systems, and research missions and values. The Roundtable is an ambitious effort to update existing incentive systems to better reflect the 21st century research practices and values and to support OS practices. As a joint effort

between research funders and higher education institutional leaders, the Roundtable is structured to maximize coordination and increase the likelihood of coherent, durable incentive structures.

The Roundtable is co-chaired by Keith Yamamoto, the Vice Chancellor for Science Policy and Strategy at University of California, San Francisco and a member of both the National Academy of Sciences and National Academy of Medicine, and Tom Kalil, the Chief Innovation Officer of Schmidt Futures and former Deputy Director for Policy for the White House Office of Science and Technology Policy. Roundtable members represent senior leadership at universities, federal agencies, philanthropies, international bodies, and other strategic organizations (See Figure 1).

## NASEM Roundtable Participants

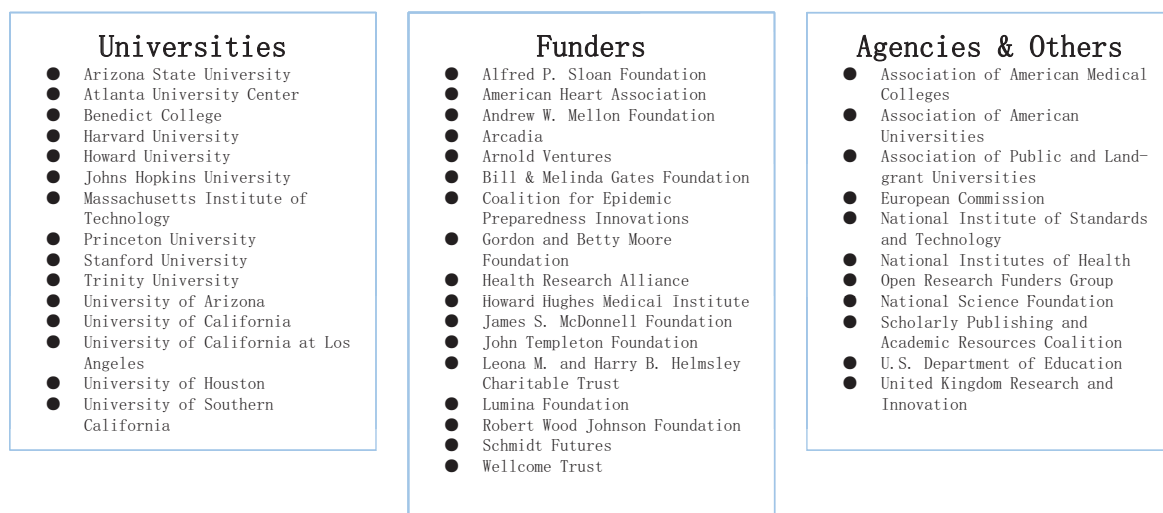


Figure 1. NASEM Roundtable members.

The Roundtable is charged [3] with convening critical stakeholders to discuss the effectiveness of current incentives for OS practices, identify barriers and disincentives of all types, and with finding concrete ways to move forward to align incentives that support common missions and values and mitigate disincentives (Figure 2).

The initial focus of the group was defining the practices that constitute OS, the general principles and values supporting OS, and identifying of the processes in which incentives to support OS were needed.

## NASEM Roundtable Goals

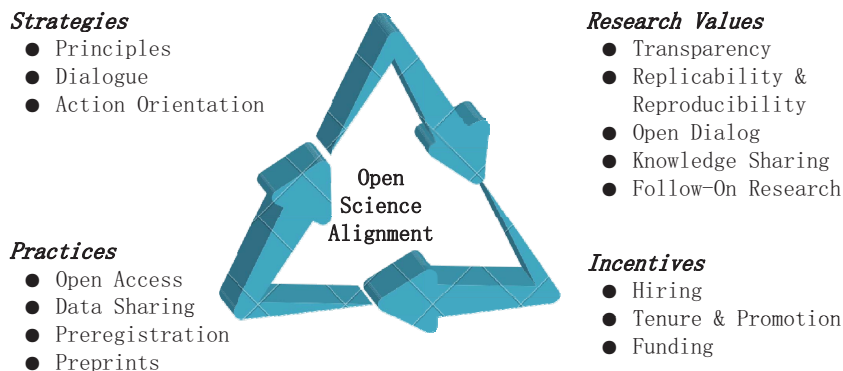


Figure 2. NASEM Roundtable goals.

The intent is for participants to gain a collective understanding of the actions that agencies, funders, and HEIs can take to realign their respective reward structures, and to create a concrete blueprint for stakeholders to customize and adopt to properly incentivize OS practices. Roundtable participants expect to test these blueprints over the course of the project, sharing their experiences under a “community of practice” model.

## 4. WORKING GROUP STRUCTURE

The Roundtable participants’ approach to addressing its charge is intentionally action-oriented. While they meet in-person (or during the pandemic virtually) just twice per year, the participants made the decision during their first convening to self-organize into working groups in order to facilitate work to be done consistently throughout the year. The initial working groups are organized around:

- 1). Identifying stakeholder gaps to accelerate adoption and harmonization;
- 2). Reimagining outputs to facilitate dissemination, reproducibility and replication, discussion, and curation;
- 3). Examining good practices for OS;
- 4). Supporting OS activities through disseminating success stories;
- 5). Sending signals to researchers that OS is valued; and
- 6). Catalyzing provost/department chair conversations to increase open sharing of research outputs.

Some of the working group charges are designed to establish foundational resources and a structure for the Roundtable’s work. For example, the “stakeholder gap” working group is tasked with ensuring that critical perspectives are solicited and included throughout the initiative’s work, while the “reimagining

outputs” group is tasked with creating a shared understanding and consensus around specific outputs and behaviors to incentivize. Similarly, the “good practices” and “success stories” working groups are continually uncovering and building a collection of examples from a diversity of institutions, disciplines, and geographies.

Two of the working groups are charged with more outward-facing roles. The “signals” group is actively creating sample language intended for use by both research funders and HEIs to overtly signal the value they place on openness—and OS practices—in key process including recruitment, hiring, orientation, promotion and tenure. This language is intended to be used independent of any specific policy requirement and ensure that the value the funder or institution places on “openness” is communicated to researchers early and often to underscore its importance. Early on in its deliberations, the Roundtable concluded that this was critical to spurring the culture change needed to incentivize OS, recognizing that if the first time a researcher or grantee heard that the institution cared about OS practices that was at the point of evaluation, it was too late to matter.

Similarly, the “Catalyzing Provost/Chair” working group’s activities are centered around sparking meaningful changes in the daily research practices within institutions. The working group is focused on creating opportunities for collaborative development of new incentive structures by first securing buy-in for the need to reward OS practices from university leadership (i.e., provosts, rectors), and activating those leaders to in turn empower department heads to work with faculty and scholarly societies to reimagine incentives that they feel are ideal for their specific disciplines. The intention is not to create a monolithic set of “one-size-fits-all” incentives that are imposed on all departments, but rather to generate community-driven incentives that can then be socialized across departments in multiple institutions, more accurately reflecting and supporting faculty needs.

The outputs of all these working groups are being shared within the Roundtable and are intended to be shared with the community at large through an online toolkit that is currently under construction by the participants. The toolkit was launched in December of 2020, and is hosted in an open repository maintained and supported by Arizona State University [4].

## 5. LOOKING FORWARD

The next phase of the Roundtable will focus on amplifying its impact. This will require diversifying and expanding both internal participants and external collaborators. The initial Roundtable construction was designed to facilitate its action-orientation—creating a small but committed “coalition of the willing” to produce concrete resources and pilots that could be socialized throughout the higher education community. As these are tested and ultimately deployed, it will be important to develop opportunities for new participants representing diverse communities to be cycled into the initiative to infuse new ideas and maintain momentum.

While NASEM provides an ideal home for the initiative's early work, its success ultimately depends on community ownership. In order for the Roundtable's activities to grow to the scale they need to truly be impactful, they have to be adopted and sustained by established entities in the research, funder and higher education communities. The Roundtable participants have made a start at building potential channels to realize this goal, through establishing collaborative programs with important stakeholders, including scholarly societies, federal agencies and executive brand working groups, and national university associations. This work should be prioritized going forward.

Perhaps most critically, the Roundtable must work to extend its efforts to connect and collaborate with international efforts, to cross-pollinate successful strategies, and build network effects. Science is a global enterprise. To fully realize the aims of OS to create an open, equitable and inclusive knowledge commons, the Roundtable should embrace the challenge of realigning incentives. It should do so in a way that fosters a culture of collaboration rather than competition and rewards the sharing of research outputs and knowledge wherever possible, to make science widely available to all.

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- **SPARC**—Serves as host organization convening the ORFG and as Secretariat to the Roundtable

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